REMARKS

Claim Status

Claims 51-59 and 62-72 remain pending.

Claim Rejections - 35 U.S.C. § 102

In the Office Action mailed on August 8, 2005, claims 51, 59, 62 and 70-72 have been rejected as allegedly being unpatentable under 35 U.S.C. § 102 over U.S. Patent No. 5,920,319 to Vining *et al.* (Vining). This rejection has been made final. Applicants respectfully traverse this rejection.

Claim 51 is generally directed to a method for performing computer aided diagnosis on a 3D, volumetric representation, of a region of interest. More particularly, Claim 51 is directed to computer aided diagnosis in which a local surface texture feature is used to identify a region which is indicative of an anomaly. Independent Claim 62 is directed to a method of computer aided diagnosis in which both a local surface texture feature and a geometric (shape) feature are used to identify anomalies. It is respectfully submitted that Vining does not teach or suggest the claimed invention of Claims 51 or 62 and that the current rejection is based on an improper reading of the Vining reference.

The Vining reference does not disclose, teach or suggest the use of textural surface features to identify an anomaly. Instead, Vining discloses only the use of shape features, such as convexity, and wall thickness. In the Office Action dated March 24, 2004 (Paper 13), the examiner stated that "Vining et al. is silent about 'textural feature of an abnormality'." Applicants believe that this initial characterization of the Vining reference by the Examiner was and remains correct. However, the Examiner now asserts that various ***shape*** characteristics would meet the claimed limitations regarding textural feature analysis. Applicants respectfully

disagree. Most of the portions of the Vining reference cited by the Examiner make it clear that Vining is only disclosing the identification of abnormalities using shape features, not texture features. (See e.g., Fig. 5; see Col. 12, lines 39-52). Those passages in Vining which use the term "texture," such as the "texture memory" disclosed in Vining are only used in performing surface rendering. There is nothing in the Vining et al. reference to suggest the use of textural features of the surface, as opposed to shape features of a surface, in an *analysis step* to identify potential anomalies.

The Vining reference relies on wall thickness values and shape parameters, such as convexity and curvature parameters to identify potential abnormalities. It is respectfully submitted that the curvature and convexity parameters disclosed in Vining are properly considered geometric (or shape) characteristics rather than textural features.

As the current application makes clear, surface texture feature analysis and geometric feature (shape) analysis are simply not the same. Indeed, different analysis techniques are invoked to analyze these two different properties. (See Specification, page 77, line 13, through page 79, line 11 for a discussion of texture analysis and compare with page 79, line 12 through page 80, line 16 for a discussion on geometrical or shape feature analysis.) In the simplest of terms, Vining only discloses detection of a "bump" on a surface (a "shape feature"), it does not disclose whether the bump has a smooth surface, a rough surface, or any other surface texture feature that is different from the area surrounding the bump (i.e., a comparison of a local texture feature to a context texture feature).

In paragraph 2 of the Office Action, several citations to Vining are included which are intended to support the Examiner's contention that Vining teaches the use of textural features to identify anamolies. Applicant respectfully submits that these citations simply do not

support this conclusion. The first point raised in paragraph 2 is directed to the operation of surface rendering using "texture memory." Applicants do not contest that Vining discloses surface rendering. However, rendering is a different operation from analysis of the underlying features to determine whether an anomaly exists. Vining does not elaborate on the operation of the "texture memory" during surface rendering. However, this is irrelevant. Rendering is different from analysis and Vining clearly does not disclose the use of textural features during an analysis operation to identify anomalies.

Second, the examiner points to Vining's disclosure regarding wall thickness to identify abnormalities and cites to col. 2, lines 31-54 of Vining. Applicants submit that wall thickness is not a measure of a textural feature of the surface and Vining's disclosure regarding a wall thickness value is simply not relevant to this claimed feature. For the third point in paragraph 2 of the office action regarding textural features, the examiner cites to col. 5, lines 40-60 for alleged support that Vining discloses a smooth surface/rough surface comparison to identify anomalies. In this passage, however, the Vining reference is discussing the ability to perform image segmentation between colonic tissue and an air column within the colon. The phase "relatively distinct and sharp" relied on in the office action is referring to the difference in image intensity values between the tissue of the colon wall and the air column and are not relevant to textural features of an anomaly. Accordingly, Applicants again assert that Vining does not teach the claimed limitations regarding "analyzing said portion of voxels representing a surface to identify a local surface texture feature, different from the context texture feature, which is indicative of an abnormality."

Independent claims 51 and 62 each recite the use of texture feature analysis which is neither disclosed, taught nor suggested by Vining. Therefore, applicants assert that claims 51

and 62, and all pending claims which depend therefrom, are patentably distinct over the Vining reference.

Claim Rejections - 35 U.S.C. § 103

In the Office Action, claims 52-58 and 63-69 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Vining in view of U.S. Patent No. 4,991,092 to Greensite (Greensite) and this rejection has been made final.

With respect to independent claims 51 and 62, it is respectfully submitted that the Greensite reference fails to overcome the fundamental shortcoming of the Vining reference - the absence of any disclosure regarding texture feature analysis. Therefore, the combination of Vining and Greensite does not render claims 51, 62, or any claim which depends from these claims, obvious. Furthermore, with regard to claims 52 and 63, the Examiner admits that Vining fails to disclose "probability density function characterizing between two voxels." The Examiner asserts that Greensite teaches "the distance between two voxels dependent on the difference in probability, the probability density of random vector at each point of the signal space" and therefore renders obvious claims 52-58 and 63-69 when combined with Vining. Applicant respectfully disagrees.

Applicants do not contend that probability density functions are new. However, claim 52 and the claims that depend therefrom are not merely claiming a probability density function. These claims are directed to a probability density function which includes the local textural features. In the passage cited by the Examiner (Col. 15, lines 36-62), Greensite does not disclose a probability density function that includes a textural feature. The probability density of Greensite, on the other hand, is of a random vector at each point of the signal space (See Office

Action at Par. 5; Col. 15, lines 6-9). The probability density disclosed in Greensite is different and distinct from the probability density function set forth in claims 52 and 63.

Because neither Vining nor Greensite, individually nor in combination, teach or suggest all of the limitations of the pending claims, Applicant respectfully asserts that claims 51 and 62, and all claims depending from these base claims are allowable over the art of record.

CONCLUSION

In view of the remarks set forth above, favorable consideration and allowance of claims 51-59, and 62-72 are respectfully solicited.

Respectfully submitted,

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